

## CORRECTED VERSION

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
31 March 2005 (31.03.2005)

PCT

(10) International Publication Number  
WO 2005/029463 A1

(51) International Patent Classification<sup>7</sup>: G10L 11/02,  
19/02, 21/02

(72) Inventors; and

(75) Inventors/Applicants (for US only): GOTANDA, Hiromu [JP/JP]; c/o Kinki University, Kyushu School of Engineering, 11-6, Kayanomori, Iizuka-shi, Fukuoka, 8208555 (JP). KANEDA, Keiichi [JP/JP]; c/o Kinki University, Kyushu School of Engineering, 11-6, Kayanomori, Iizuka-shi, Fukuoka, 8208555 (JP). KOYA, Takeshi [JP/JP]; c/o Kinki University, Kyushu School of Engineering, 11-6, Kayanomori, Iizuka-shi, Fukuoka, 8208555 (JP).

(21) International Application Number: PCT/JP2004/012899

(74) Agents: YAGUCHI, Taro et al.; Omori And Yaguchi, 4th Floor Matrice Bldg., 2-13-7, Minamiaoyama, Minato-ku, Tokyo, 1070062 (JP).

(22) International Filing Date: 31 August 2004 (31.08.2004)

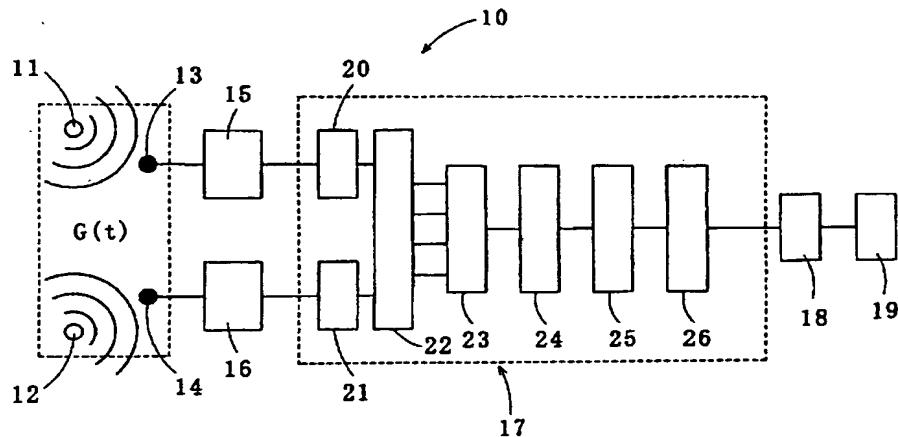
(25) Filing Language: English

(26) Publication Language: English

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,

[Continued on next page]

(54) Title: A METHOD FOR RECOVERING TARGET SPEECH BASED ON SPEECH SEGMENT DETECTION UNDER A STATIONARY NOISE



(57) Abstract: Method for recovering target speech by extracting signal components falling in a speech segment, which is determined based on separated signals obtained through the Independent Component Analysis, thereby minimizing the residual noise in the recovered target speech. The present method comprises: the first step of receiving target speech emitted from a sound source and a noise emitted from another sound source and extracting estimated spectra  $Y^*$  corresponding to the target speech by use of the Independent Component Analysis; the second step of separating from the estimated spectra  $Y^*$  an estimated spectrum series group  $y^*$  in which the noise is removed by applying separation judgment criteria based on the kurtosis of the amplitude distribution of each of estimated spectrum series in  $Y^*$ ; the third step of detecting a speech segment and a noise segment of the total sum  $F$  of all the estimated spectrum series in  $y^*$  by applying detection judgment criteria based on a predetermined threshold value  $T$  that is determined by the maximum value of  $F$ ; and the fourth step of extracting components falling in the speech segment from the estimated spectra  $Y^*$  to generate a recovered spectrum group of the target speech for recovering the target speech.

WO 2005/029463 A1



PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— with international search report

(48) **Date of publication of this corrected version:**

7 July 2005

(15) **Information about Correction:**

see PCT Gazette No. 27/2005 of 7 July 2005, Section II

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*